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LETTER REPORT
FOR
RIVERDALE CHEMICAL
CHICAGO HEIGHTS, COOK COUNTY, ILLINOIS
TDD: S05-0008-002
PAN: 0G0201RSXX

December 15, 2000

Prepared for:

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
77 West Jackson Boulevard
Chicago, Illinois 60604

Prepared by: _____ Date: 12/15/00
Larry Lueck, START Project Manager

Reviewed by: _____ Date: 12/15/00
Patrick Zwilling, START Assistant Program Manager

Approved by: _____ Date: 12/15/00
Daniel Sewall, START Program Manager

ecology and environment, inc.
International Specialists in the Environment
33 North Dearborn Street, Chicago, Illinois 60602
Tel. 312/578-9243, Fax: 312/578-9345

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December 15, 2000

Ms. Gail Nabasny, START Project Officer
Emergency Support Section
United States Environmental Protection Agency
77 West Jackson Boulevard
Chicago, Illinois 60604

RE: Riverdale Chemical
Chicago Heights, Cook County, Illinois
TDD: S05-0008-002
PAN: 0G0201RSXX

Dear Ms. Nabasny:

The United States Environmental Protection Agency (U.S. EPA) tasked the Superfund Technical Assessment and Response Team (START) contractor, Ecology and Environment, Inc. (E & E), under Technical Direction Document (TDD) S05-0008-002, to assist On-Scene Coordinator (OSC) Callie Bolattino with oversight of potentially responsible party (PRP) removal, assessment, and construction activities at the above referenced site.

The address of the Riverdale Chemical (RC) site is 220 East 17th Street, Chicago Heights, Cook County, Illinois. Coordinates for the northwest corner of the site are latitude 41°29'56.7" north by longitude 87°37'23.8" west (Attachment A, Figure 1). The site is bordered on the north by Chicago Heights Terminal Transfer Railroad tracks, East 17th Street, and a residential neighborhood. Baltimore and Ohio Railroad tracks and a demolished roofing company property border the site on the east. Michigan Central Railroad tracks on a 15-foot-high embankment and an active steel processing factory border the site on the south. A 20-acre vacant lot borders the site on the west. Although zoned for industrial use, the RC site is located in a mixed residential, industrial, and commercial area. Approximately 10,000 people living within 3 miles of the site are served by private wells.

Topography on the relatively flat 10-acre RC site slopes gently to the east and southeast. The southeastern portion of the site includes a wetland area of somewhat less than an acre that has no natural drainage and is assumed to be a perched system. Most water enters the wetland area via runoff from the southern portion of the site, from a ditch that flows eastward just outside the southern RC site boundary, and from direct precipitation (Attachment A, Figure 2). As indicated by previous subsurface investigations and by current construction boring and excavating, most of the outdoor portions of the site are surfaced with crushed limestone 8 inches to more than 1 foot thick. Below that is mainly fill between 2 and 5 feet thick, which in turn is underlain by lake-bottom clay which may be dark brown and plastic near the surface, stiffening and lightening in color with depth. Area well logs indicate that up to 35 feet of this clay overlies the Silurian-aged Niagara Dolomite, which is considered to be the uppermost aquifer in the region.

There are four buildings and an aboveground storage tank (AST) area on site. Buildings No. 1 through No. 3 house chemical storage, formulation, and packing facilities, while Building No. 4 is used to

store packaging supplies. The ASTs hold liquid chemicals used in formulation processes. Dry chemical components are currently stored outdoors on pallets, mainly in the southeast portion of the site. An active railroad spur enters the site from the northwest and ends between Buildings No. 2 and No. 3, where tank cars are unloaded. Another railroad spur crosses the northeast corner of the site, but then runs south along the east side of the wetland area to the steel plant located just south of the site.

Since purchasing the site in 1956, Riverdale Chemical Company (Riverdale) has formulated various fungicide, herbicide, and insecticide products at the site, and currently formulates agricultural and lawn chemical products. Previous owners used the site for carriage building, brewing, and warehousing. Constructed some time after April 1997, Building No. 1 is located on a portion of the site known to have been impacted by chemical spillage. Soil excavated in the course of Building No. 1 construction was placed somewhere in the southeast portion of the site.

RC site contamination first came to U.S. EPA attention April 1984, when a Field Investigation Team (FIT) site assessment detected pesticides, volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), and dioxin in site surface soil samples, with dioxin concentrations up to 364 micrograms per kilogram (µg/kg). An Administrative Order by Consent between U.S. EPA and Riverdale called for an Interim Response (IR), followed by a Remedial Investigation (RI). Under the IR, Riverdale placed geofabric and a layer of crushed limestone over approximately 20,000 square feet of contaminated ground to prevent direct-contact and airborne exposure to hazardous substances. The RI, conducted in two phases between October 1985 and November 1986, detected widespread pesticide and dioxin contamination in surface soils ranging from 130 µg/kg for lindane to 1,000,000 µg/kg for chlordane. Dioxin was detected at an average concentration of 17.5 µg/kg and a maximum of 364 µg/kg. In the subsurface, approximately 0 to 3 feet below ground surface, pesticides were widely detected, including heptachlor epoxide to 160 µg/kg and dieldrin to 200,000 µg/kg, but dioxin was barely detected.

On July 2, 1992, lightning caused a fire that completely destroyed a 10,000-square-foot warehouse containing various fungicide, herbicide, and insecticide products, including the active ingredients 2,4-D, Dicamba, 2,4-DP, MCPA, and MCPP. Although firefighting efforts and management of the residue, including runoff water, were overseen by U.S. EPA and the Illinois Environmental Protection Agency (Illinois EPA) in cooperation with local agencies, much of the runoff presumably ended up in the wetland area at the southeast corner of the property.

On October 12, 1999, E & E conducted a limited non-sampling ecological field reconnaissance of the RC site as part of an Engineering Evaluation/Cost Analysis (EE/CA) being prepared for U.S. EPA. This study confirmed that wetland habitat is present in the southeast corner of the site.

In August 2000, Riverdale began construction of upgrades to existing site structures to bring the Chicago Heights facility into compliance with U.S. Department of Agriculture (USDA) requirements for manufacturers of herbicide products. Under an agreement with USDA, U.S. EPA gave Riverdale permission to proceed, stipulating that any hazardous wastes generated would be properly disposed of. Because site soils were known to be contaminated, including in the areas of proposed construction, Riverdale hired contractors who could field exclusively Occupational Safety and Health Administration (OSHA) 40-hour-trained workers, and Chicago environmental consulting firm RMT, Inc. (RMT), to perform on-site media sampling, hazardous waste disposal, and health and safety monitoring. START was tasked by U.S. EPA to perform oversight during sampling and excavation of contaminated soil in construction areas.

On August 21, 2000, START member Larry Lueck arrived on site. Excavation and caisson drilling had already begun in two of the three main construction locations. START met Dr. Peter Bibby and Mr. Conrad Harwell of Riverdale, and Ms. Rae Mindock and Ms. Heather Sues of RMT. Dr. Bibby led START on a tour of the entire facility, accompanied by Ms. Mindock. Of primary interest were two areas under construction, known as the railroad containment and the tank farm; a third area of planned

construction in the southeastern portion of the site; and the wetland (Attachment A, Figure 2).

The railroad containment is to consist of two below-grade, concrete-lined troughs approximately 100 feet long between Buildings No. 2 and No. 3, where surface soil is known to contain the pesticides aldrin and dieldrin. The western trough, located under the rail spur, is intended to contain liquid spills from tank cars. The eastern trough, connected by underground pipe to the western trough, is intended to hold overflow from the western trough in the worst case release of the entire contents of a full tank car. On August 21, 2000, excavation of the eastern trough had begun, and ties and rails were being removed to allow excavation of the western trough. Soil from the railroad containment area was trucked to a stockpile on plastic sheeting in the northeast corner of the site to await sampling and disposal.

Also as of August 21, 2000, aboveground tanks had been removed from the western half of the tank farm and a drill rig was advancing caisson boreholes to 9 feet below grade, then flaring the borehole bottom ends with a bell bucket (Attachment B, Photodocumentation). A concrete containment was to be constructed approximately at grade in this location. The tanks still in use on the eastern half of the area, which is now bermed approximately 3 feet high with crushed stone, would then be moved to the new containment so that a similar concrete structure could be built on the eastern half of the tank farm area. The concrete caissons are poured each day as boreholes are completed, to prevent dessication from causing collapse of the borehole walls. Cuttings from the boreholes were being stockpiled on plastic sheeting just east of the tank farm to await sampling and disposal.

The third main construction site was the area labeled "pallet storage" on Figure 2. In this location, the existing concrete slab remaining from the 1992 warehouse fire, labeled "raw materials storage pad" on Figure 2, would be extended to the south at approximately the same width. A new materials storage warehouse will then be built over the combined slab.

On August 23, 2000, RMT collected six-point composite samples of soil from the railroad containment stockpile and from the drilling soil stockpile, to be analyzed for disposal parameters. Excavation of the eastern railroad containment had also reached the desired depth, approximately 6 feet below grade. RMT later directed the trackhoe to collect a bucket of soil from the tan clay layer at the bottom of the excavation, approximately 25 feet north of the south end. From this bucket, RMT collected confirmation soil sample number SL37, to be sent to a contract laboratory for analysis of the site-specific contaminants of concern (COCs): aldrin, chlordane, dieldrin, heptachlor, heptachlor epoxide, and toxaphene. START requested and received a co-located portion (split) of this sample for independent laboratory analysis (Attachment A, Figure 3 and Attachment C, Table 1). Soil remaining in the trackhoe bucket was added to the appropriate stockpile. RMT later collected another confirmation sample, by the same means, of bottom clay near the north-south midpoint of the eastern excavation. Later the same day, the START portion of soil sample SL37 was shipped via Federal Express to CT&E Analytical Services (CT&E) in Ludington, Michigan, to be analyzed for pesticides under analytical TDD number S05-0008-810.

Previous to the beginning of START oversight, RMT had collected soil samples from four shallow test pits dug in a square around a patch of known contamination just south of the raw materials storage pad. Analysis of these samples had detected concentrations of one or more COCs above the site-specific risk-based concentrations (RBCs). On August 24, 2000, with START present, RMT dug four new test pits approximately 5 feet northeast, northwest, southwest, and southeast of the four previous ones to further define the lateral extent of the contamination. In each test pit, one soil sample was collected just below the crushed stone layer at the original ground surface, and one sample was collected at a depth of approximately 3½ feet below the original ground surface. These samples were sent to RMT's contract laboratory for COC analysis. START did not spilt any of these samples but observed and documented the activities. Typical site clay was present in the bottom 6 inches to 1 foot of each test pit, the overlying materials being darker-colored fill soil containing glass and other debris.

On August 28, 2000, RMT collected confirmation samples of the clay in the bottom of the western railroad containment excavation, one near the north end and one near the south end (Attachment A, Figure 3). START requested a split of the southern sample, number SL40, and shipped it via Federal Express the same day to CT&E for analysis of pesticides (Attachment C, Table 1). A representative from Onyx/Waste Management was on site to discuss disposal of the excavated soil.

On August 31, 2000, RMT used a subcontracted Geoprobe and operators to advance four boreholes to approximately 5 feet below grade in a roughly square pattern around location SL17, a former RMT sampling point in the eastern half of the tank farm from which COCs in soil samples had analyzed above the RBCs. Each borehole indicated from 1 to 3 feet of grayish-brown clay below much darker fill material. RMT collected two soil samples from each core, one near the bottom, i.e. approximately 5 feet below grade, and one representing the upper, darker material. Approximately 3 to 4 feet of material was recovered in each core, so the depth of the upper sample could not be determined with perfect precision. Two boreholes were advanced to the same depth, in similar stratigraphy, just west of the Hartwell Annex to Building No. 3, from which RMT collected two soil samples each for COC analysis (Attachment A, Figures 2 and 3). Riverdale proposes to build an addition to the Annex at this location to house some additional tanks. The Geoprobe advanced three boreholes along the western edge of the wetland area as directed by RMT, obtaining 2 to 3 feet of recovery from each core. In each, the top portion was black, organic-rich mud, grading down to gray plastic clay. Finally, RMT collected three surface soil/sediment samples from the wetland at locations shown approximately in Attachment A, Figure 3. OSC Bollatino and Remedial Project Manager (RPM) Matt Ohl, who were on site, gave consent for Riverdale to begin construction of the materials storage pad extension.

On September 6, 2000, Riverdale excavated contaminated soil just south of the raw materials storage pad, within the square defined by the four August 24th test pits, to a depth of 5 feet below grade, and stockpiled the soil nearby on plastic sheeting. An additional 5-foot-wide swath was excavated as a buffer zone to the same depth on the west and south edges of the main excavation because of slight amounts of contamination found in samples from two test pits; this soil was stockpiled separately on plastic sheeting. Most of the excavated material was dark fill containing glass and other debris, becoming clay rich near the bottom. The final dimensions of the hole were approximately 45 feet east-west by 35 feet north-south. When the excavation had been completed, RMT collected confirmation soil samples from four locations using the backhoe bucket, two on the sides of the excavation and two on the bottom (Attachment A, Figure 3) for COC analysis, and a separate composite sample from each of the two soil stockpiles for disposal parameters analysis. The excavation was to be backfilled with clean fill so that construction of the storage pad extension could proceed. Finally, RMT stated that additional sample volume had to be collected from two of the previously sampled wetland areas because insufficient sediment was collected on August 31st to analyze for dioxin. RMT and START agreed that the central location should be most representative, and that the southwest location is closest to where the southern property line ditch enters the wetland. RMT returned to the two original sampling points at these locations, which could still be seen, and collected additional sample for dioxin analysis.

On September 21, 2000, RMT again mobilized a subcontracted Geoprobe and operator to site, this time to sample certain predetermined locations in the parking lot that extends over the width of the property on the north side. The OSC had asked START to be present for this event and to have one split sample analyzed for full VOCs, SVOCs, Resource Conservation and Recovery Act (RCRA) metals, and pesticides. At the first borehole, advanced to 4 feet below grade just inside and west of the site gate, and south of the guard shack (Attachment A, Figure 3), START requested four 4-ounce bottles of soil from the shallowest portion of the core (Attachment C, Table 1). START shipped this sample, number SL64, via Federal Express to CT&E later the same day. Altogether, RMT sampled from seven boreholes located approximately as shown in Figure 3. Except for the far northwest and northeast boreholes, each boring

was advanced to 4 feet below grade, with separate samples collected from 0 to 2 feet and 2 to 4 feet. The far northwest borehole, SL66, was advanced to 8 feet below grade. RMT collected the usual two samples from the upper 4 feet, including separate duplicate and mATRIX spike duplicate portions. A sample consisting of four small bottles of stiff brown clay was collected from the lower 4 feet for analysis of physical parameters. The northeast borehole was advanced to 8 feet below grade, but only the physical parameters sample was collected from the lower core. This portion of the site reportedly has never been used for anything except vehicle parking and the recent soil stockpiling.

On October 20, 2000, RMT advanced six additional Geoprobe boreholes in the eastern half of the tank farm with START oversight (Attachment A, Figure 3). Two of the boreholes were offset from the planned locations because of kerosene odor in the first samples collected; the intent was to find clean soil at the edges of the contaminated area. START requested four 4-ounce bottles of soil from the 2 to 4 foot interval of boring SL76, which were shipped to CT&E on October 23, 2000, for analysis of VOCs, SVOCs, pesticides, and RCRA metals (Attachment C, Table 1).

On November 2, 2000, START returned to site to witness excavation and sampling of the eastern portion of the tank farm. By this time, concrete had been poured at both railroad containment areas and construction was under way there; a large concrete extension had been poured adjacent to the raw materials storage area on the south and construction of a warehouse had begun there; the concrete pad and containment had been poured for the western portion of the tank farm and tanks were being installed there (Attachment A, Figure 2A, and Attachment B); and previously stockpiled soil from various excavations had been transported offsite for disposal. Excavation for the eastern portion of the tank farm had begun, with RMT representative Dave Yaros present to collect two confirmation soil samples from the base of the excavation. A near-surface layer of petroleum-contaminated fill had been uncovered that appeared to extend for the east-west width of the excavation and to be particularly concentrated in the northern end, gradually diminishing toward the south. Beneath this contaminated layer, at a depth of approximately 5 feet below grade, the usual tan and gray clay was encountered and appeared to be uncontaminated. All of the fill down to this level was removed throughout the tank farm excavation. Soil was hauled by two 20-cubic-yard dump trucks to the stockpile location in the northeastern corner of the site. Yaros entered the excavation to collect confirmation soil sample SL80 from the tan and gray clay near the center of the north end near the approximate location of former borehole SL17 (Attachment A, Figure 3A). START requested one 2-ounce bottle with zero headspace and three 4-ounce bottles from sample SL80 for independent laboratory analysis. A short time later, Yaros collected sample SL81 from soft brown silty clay near the center of the southern end approximately 3½ feet below grade, where the black, petroleum contamination layer did not appear to have been present.

START departed the site as excavation of the eastern tank farm continued. Later START shipped sample SL80 to CT&E Analytical Services in Ludington, Michigan, for analysis of VOCs, SVOCs, PCBs, pesticides, and RCRA metals, requesting a turnaround time of seven business days for verbal results.

Results from the laboratory analyses from samples submitted by START are presented in Attachment C, Tables 2 and 3. The original laboratory reports and validation memorandum are in Attachment D. All pesticides were non-detect for confirmation sample SL37 collected near the south end of the eastern railroad containment excavation. The following pesticides were detected in confirmation sample SL40 collected near the south end of the western railroad containment excavation: 4,4'-DDD at 510 µg/kg; 4,4'-DDT at 500 µg/kg; aldrin at 6,000 µg/kg; alpha-chlordane at 55 µg/kg; dieldrin at 82 µg/kg; gamma-BHC (lindane) at 42 µg/kg; gamma-chlordane at 360 µg/kg; and heptachlor at 500 µg/kg. Geoprobe sample SL64, from the borehole just inside the site gate, contained 160 µg/kg of toluene. Geoprobe sample SL76, from the southeastern corner of the tank farm, contained several VOCs and SVOCs in concentrations from 1,100 µg/kg to 29,000 µg/kg. Confirmation sample SL80, from near the north end of the eastern tank farm excavation, contained 13 VOCs in concentrations from 1,200 µg/kg to

110,000 µg/kg, as well as the SVOC 2-methylnaphthalene at 7,950 µg/kg. RCRA metals were not detected at elevated concentrations in any of the samples.

This Letter Report completes the deliverable requirements of the TDD. If you should have any questions or require additional information, please contact our office.

Sincerely,

Larry Lueck
START Project Manager

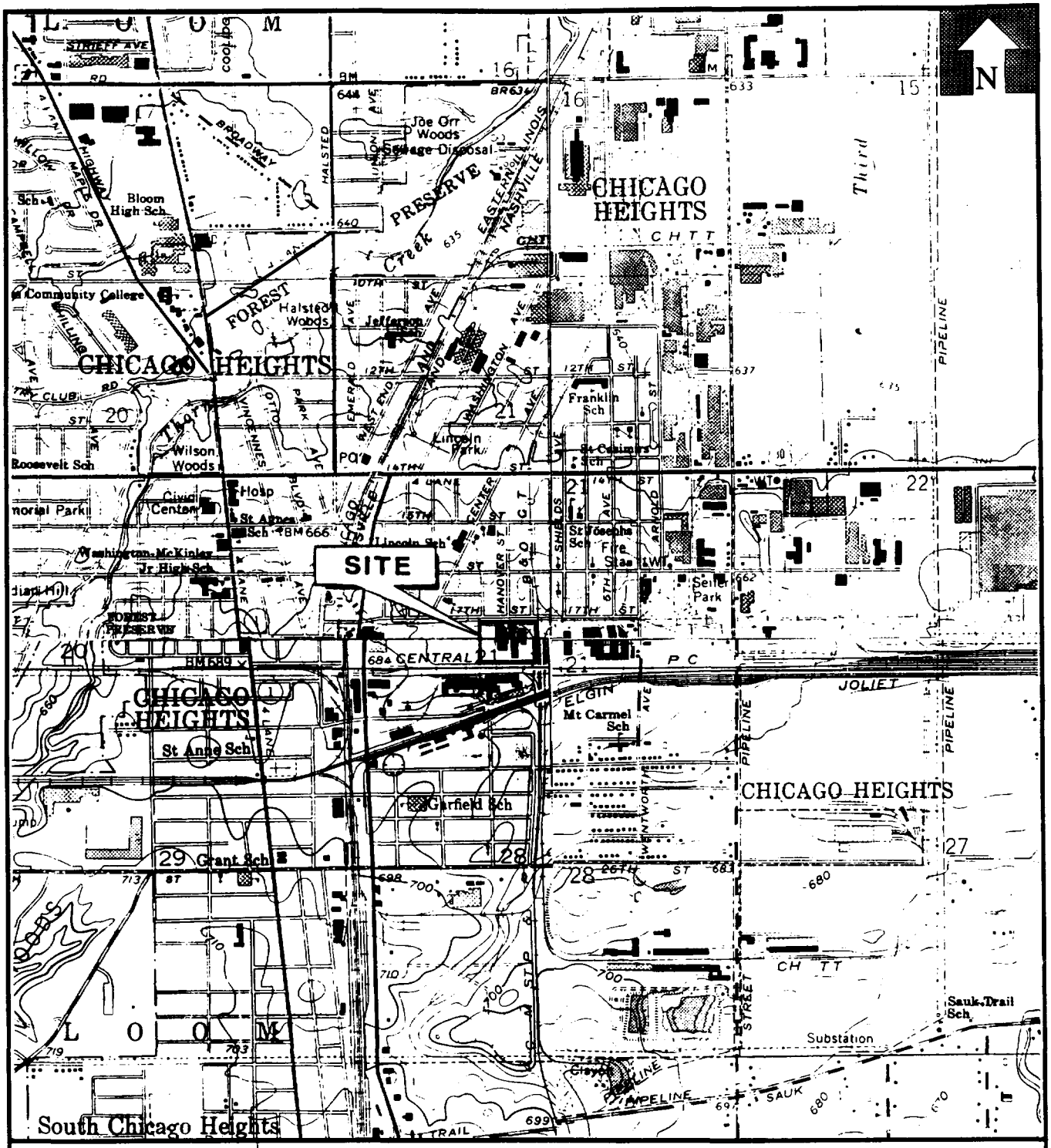
Daniel Sewall
START Program Manager

Attachments: A - Figures
B - Photodocumentation
C - Data Tables
D - Validated Analytical Results

cc: Callie Bollatino, U.S. EPA On-Scene Coordinator
TDD file

Attachment A

Figures

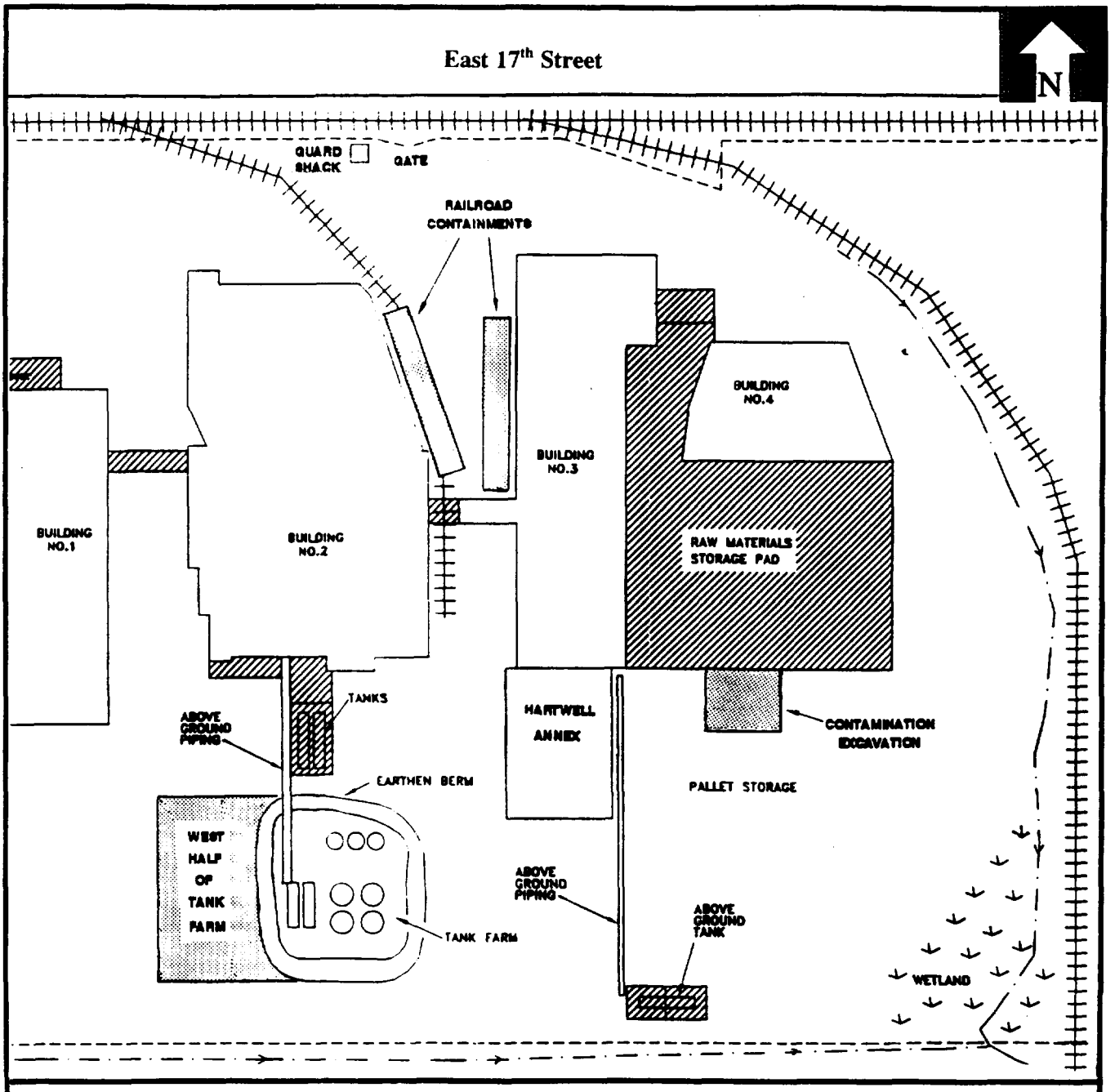


Quadrangle Location

Illinois

ecology and environment, inc.
Region 5 - Superfund Technical Assessment and Response Team
33 North Dearborn Street, Chicago, Illinois 60602

TITLE: Site Location Map	FIGURE: 1
SITE: Riverdale Chemical	SCALE: 1:24,000
CITY: Chicago Heights STATE: Illinois	TDD: S05-0008-002
SOURCE: USGS 7.5 Minute Series, Calumet City, Dyer, Harvey, and Steger, IL Quadrangles	DATE: 1968; 1962; 1963; 1953 REVISED: 1973

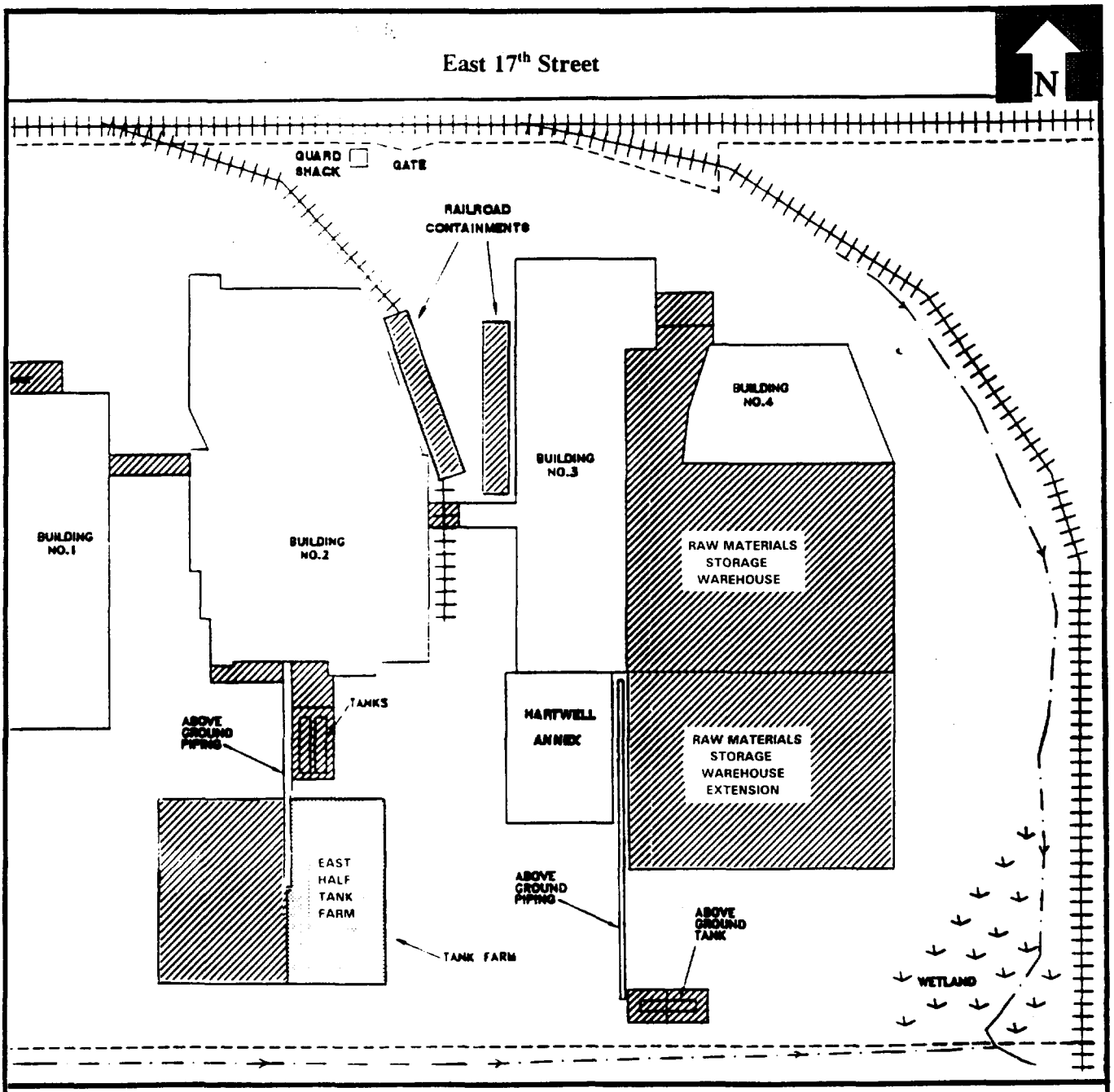


Legend

- Site fence
- Railroad tracks
- Ditch, with flow direction
- Concrete
- Excavation

ecology and environment, inc.
Region 5 - Superfund Technical Assessment and Response Team
33 North Dearborn Street, Chicago, Illinois 60602

TITLE	Site Features Map	FIGURE	2
SITE	Riverdale Chemical	SCALE	See scale bar
CITY	Chicago Heights	STATE Illinois	TDD S05-0008-002
SOURCE	Ecology and Environment, Inc.	DATE	October, 2000

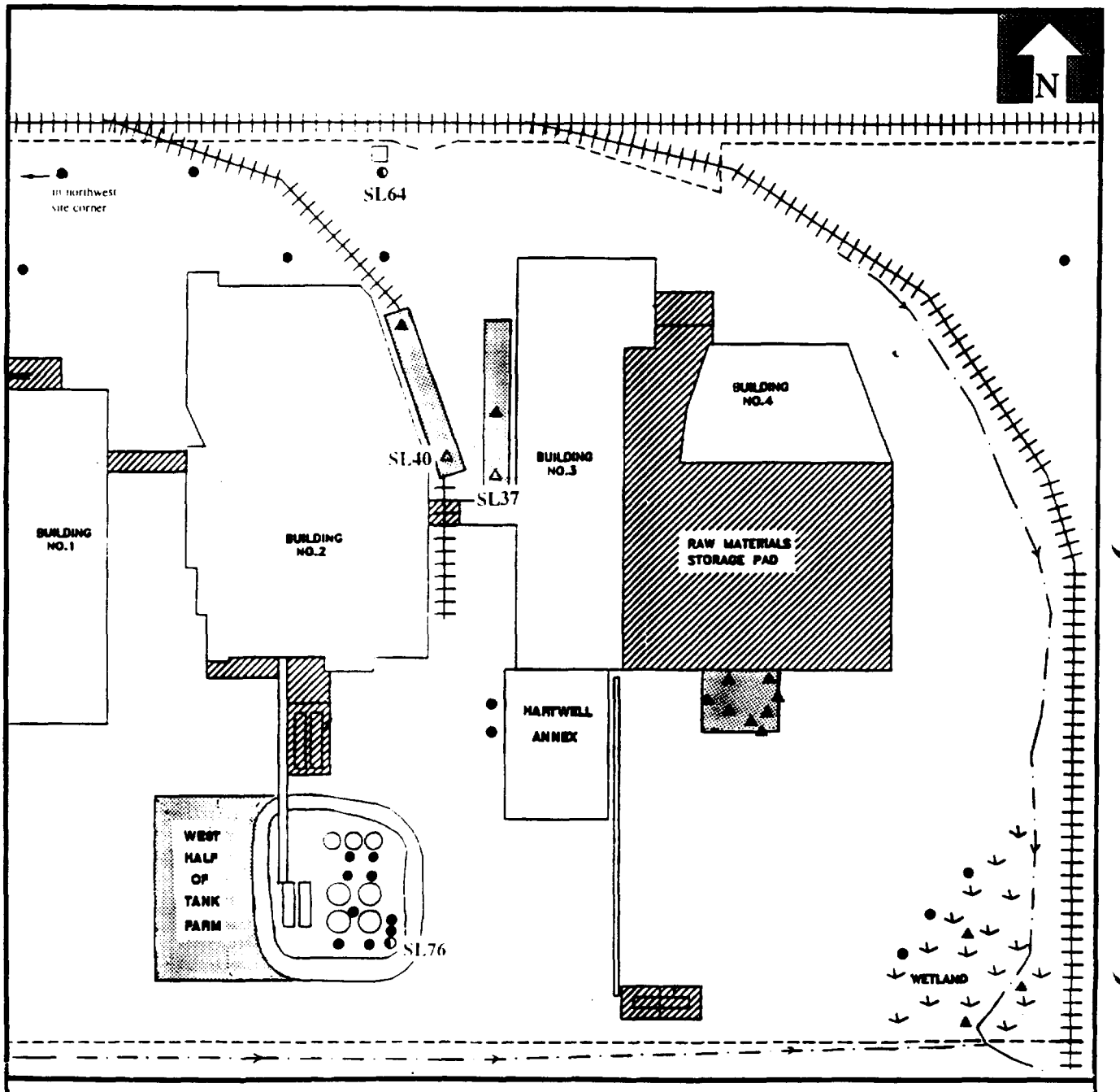


Legend

- Site fence
- Railroad tracks
- Ditch, with flow direction
- Concrete
- Excavation

ecology and environment, inc.
Region 5 - Superfund Technical Assessment and Response Team
33 North Dearborn Street, Chicago, Illinois 60602

TITLE: Site Features Map	FIGURE: 2A
SITE: Riverdale Chemical	SCALE: See scale bar
CITY: Chicago Heights STATE: Illinois	TDD: S05-0008-002
SOURCE: Ecology and Environment, Inc.	DATE: November 2000

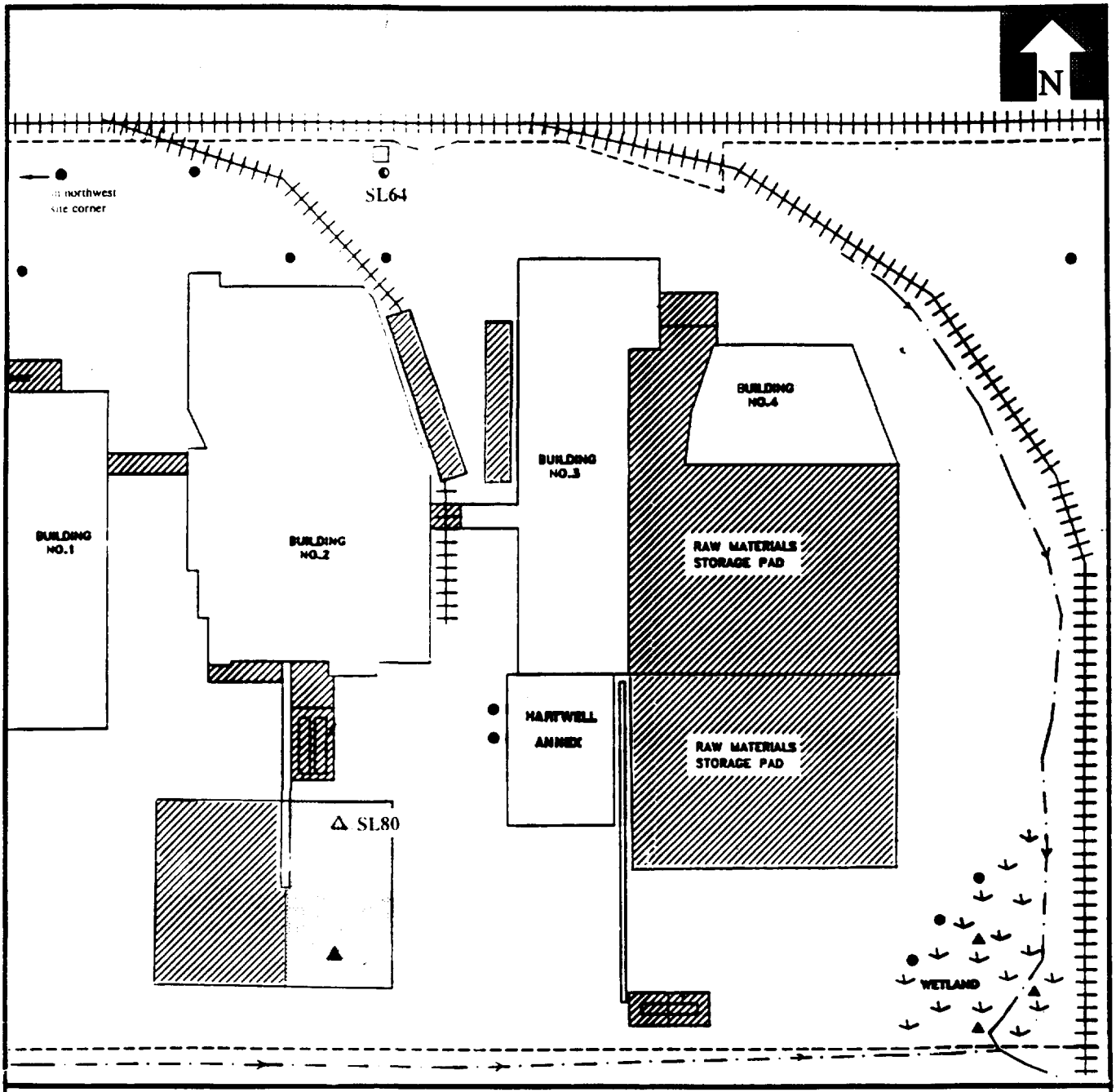


Legend

- ▲ PRP soil grab sample witnessed by START
- △ SL64 START co-located soil grab location
- ● PRP Geoprobe location witnessed by START
- ◐ SL64 START co-located Geoprobe location

ecology and environment, inc.
Region 5 - Superfund Technical Assessment and Response Team
33 North Dearborn Street, Chicago, Illinois 60602

TITLE	Sample Location Map	FIGURE 3
SITE	Riverdale Chemical	SCALE See scale bar
CITY	Chicago Heights STATE Illinois	TDD S05-0008-002
SOURCE	Ecology and Environment, Inc.	DATE October 2000



0 100 200 300

SCALE: (IN FEET)

Legend

- ▲ PRP soil grab sample witnessed by START
- △ SL64 START co-located soil grab location
- ● PRP Geoprobe location witnessed by START
- ◐ SL64 START co-located Geoprobe location

ecology and environment, inc.
Region 5 - Superfund Technical Assessment and Response Team
33 North Dearborn Street, Chicago, Illinois 60602

TITLE: Sample Location Map	FIGURE: 3A
SITE: Riverdale Chemical	SCALE: See scale bar
CITY: Chicago Heights STATE: Illinois	TDD: S05-0008-002
SOURCE: Ecology and Environment, Inc.	DATE: November 2000

Attachment B

Photodocumentation

Site: Riverdale Chemical **Date:** 11/6/00 **Time:** 1147 **Direction:** N
TDD: S05-0008-002 **Photographer:** L. Lueck
Description: Eastern railroad containment under construction.

Site: Riverdale Chemical **Date:** 11/6/00 **Time:** 1130 **Direction:** SE
TDD: S05-0008-002 **Photographer:** L. Lueck
Description: New materials storage building under construction.

Site: Riverdale Chemical **Date:** 11/6/00 **Time:** 1132 **Direction:** SW
TDD: S05-0008-002 **Photographer:** L. Lueck
Description: Drilling caissons for the eastern half of the tank farm; installing new tanks on western half.

Site: Riverdale Chemical **Date:** 11/6/00 **Time:** 1143 **Direction:** NW
TDD: S05-0008-002 **Photographer:** L. Lueck
Description: Drilling and constructing caissons for eastern half of tank farm.

Site: Riverdale Chemical **Date:** 11/6/00 **Time:** 1146 **Direction:** NNW
TDD: S05-0008-002 **Photographer:** L. Lueck
Description: Western railroad containment under construction.

Site: Riverdale Chemical **Date:** 9/21/00 **Time:** 0850 **Direction:** NW
TDD: S05-0008-002 **Photographer:** L. Lueck
Description: Geoprobe location SL65 by railroad spur, south-southwest of guard shack.

Site: Riverdale Chemical **Date:** 9/21/00 **Time:** 0857 **Direction:** NW
TDD: S05-0008-002 **Photographer:** L. Lueck
Description: Geoprobe location SL66, northwest corner of main parking lot.

Site: Riverdale Chemical **Date:** 9/21/00 **Time:** 0932 **Direction:** SW
TDD: S05-0008-002 **Photographer:** L. Lueck
Description: Geoprobe location SL67 due north of west building front (north) door.

Site: Riverdale Chemical **Date:** 9/21/00 **Time:** 0948 **Direction:** NNE
TDD: S05-0008-002 **Photographer:** L. Lueck
Description: Test hole location in northeast corner of site at edge of former soil stockpile.

Site: Riverdale Chemical **Date:** 9/21/00 **Time:** 0812 **Direction:** S
TDD: S05-0008-002 **Photographer:** L. Lueck
Description: Railroad containments under construction.

Site: Riverdale Chemical **Date:** 9/21/00 **Time:** 0812 **Direction:** S
TDD: S05-0008-002 **Photographer:** L. Lueck
Description: Railroad containments under construction.

Site: Riverdale Chemical **Date:** 9/21/00 **Time:** 0834 **Direction:** NW
TDD: S05-0008-002 **Photographer:** L. Lueck
Description: Geoprobe location SL62 (small pile of bentonite beside hard hat).

Site: Riverdale Chemical **Date:** 0/21/00 **Time:** 0835 **Direction:** SSE
TDD: S05-0008-002 **Photographer:** L. Lueck
Description: Geoprobe location SL63 outside main office entrance.

Site: Riverdale Chemical **Date:** 9/6/00 **Time:** 0952 **Direction:** SW
TDD: S05-0008-002 **Photographer:** L. Lueck
Description: South wall soil sample location (bucket teeth marks), B4/SL01 excavation.

Site: Riverdale Chemical **Date:** 9/6/00 **Time:** 1005 **Direction:** NW
TDD: S05-0008-002 **Photographer:** L. Lueck
Description: Soil sample location of beveled west edge of B4/SL01 excavation.

Site: Riverdale Chemical **Date:** 9/6/00 **Time:** 1010 **Direction:** SW
TDD: S05-0008-002 **Photographer:** L. Lueck
Description: West half of tank farm construction area being prepared for concrete.

Site: Riverdale Chemical **Date:** 9/21/00 **Time:** 0753 **Direction:** ENE
TDD: S05-0008-002 **Photographer:** L. Lueck
Description: First Geoprobe location, SL64.

Site: Riverdale Chemical **Date:** 9/6/00 **Time:** 0853 **Direction:** NW
TDD: S05-0008-002 **Photographer:** L. Lueck
Description: Putting poly sheet down on concrete slab to contain soil being excavated from area surrounding location B4/SL01.

Site: Riverdale Chemical **Date:** 9/6/00 **Time:** 0923 **Direction:** N
TDD: S05-0008-002 **Photographer:** L. Lueck
Description: Footing/wall discovered at south end of existing slab while excavating soil around location B4/SL01.

Site: Riverdale Chemical **Date:** 9/6/00 **Time:** 0945 **Direction:** NE
TDD: S05-0008-002 **Photographer:** L. Lueck
Description: Sample location, east wall of B4/SL01 soil excavation.

Site: Riverdale Chemical **Date:** 9/6/00 **Time:** 0949 **Direction:** NW
TDD: S05-0008-002 **Photographer:** L. Lueck
Description: Soil sample location (bucket teeth marks in shadow), bottom of southeast quadrant, B4/SL01 excavation.

Site: Riverdale Chemical **Date:** 9/6/00 **Time:** 0825 **Direction:** S
TDD: S05-0008-002 **Photographer:** L. Lueck
Description: Progress on eastern railroad containment.

Site: Riverdale Chemical **Date:** 9/6/00 **Time:** 0825 **Direction:** S
TDD: S05-0008-002 **Photographer:** L. Lueck
Description: Progress on western railroad containment.

Site: Riverdale Chemical **Date:** 9/6/00 **Time:** 0850 **Direction:** SW
TDD: S05-0008-002 **Photographer:** L. Lueck
Description: Excavating 20' x 20' area centered on sample location B4/SL01, including old corrugated drainage pipe previously encountered in test pits SL34 and SL35.

Site: Riverdale Chemical **Date:** 9/6/00 **Time:** 0851 **Direction:** W
TDD: S05-0008-002 **Photographer:** L. Lueck
Description: Five-foot wide trench is 'safety zone' of additional soil excavated around the perimeter of the 20' x 20' square area of known contamination.

Site: Riverdale Chemical **Date:** 8/31/00 **Time:** 1047 **Direction:** NNE
TDD: S05-0008-002 **Photographer:** L. Lueck
Description: Third wetland Geoprobe location.

Site: Riverdale Chemical **Date:** 8/31/00 **Time:** 1050 **Direction:** E
TDD: S05-0008-002 **Photographer:** L. Lueck
Description: Sediment sample location in extreme southwest corner of wetland area near off-site drainage ditch.

Site: Riverdale Chemical **Date:** 8/31/00 **Time:** 1058 **Direction:** NE
TDD: S05-0008-002 **Photographer:** L. Lueck
Description: Sediment sample location in approximate center of site wetland area.

Site: Riverdale Chemical **Date:** 8/31/00 **Time:** 1103 **Direction:** N
TDD: S05-0008-002 **Photographer:** L. Lueck
Description: Sediment sample location in southeast portion of site wetland area.

Site: Riverdale Chemical **Date:** 8/31/00 **Time:** 0900 **Direction:** NE
TDD: S05-0008-002 **Photographer:** L. Lueck
Description: Southern one of two Geoprobe locations on west side of Hartwell Annex.

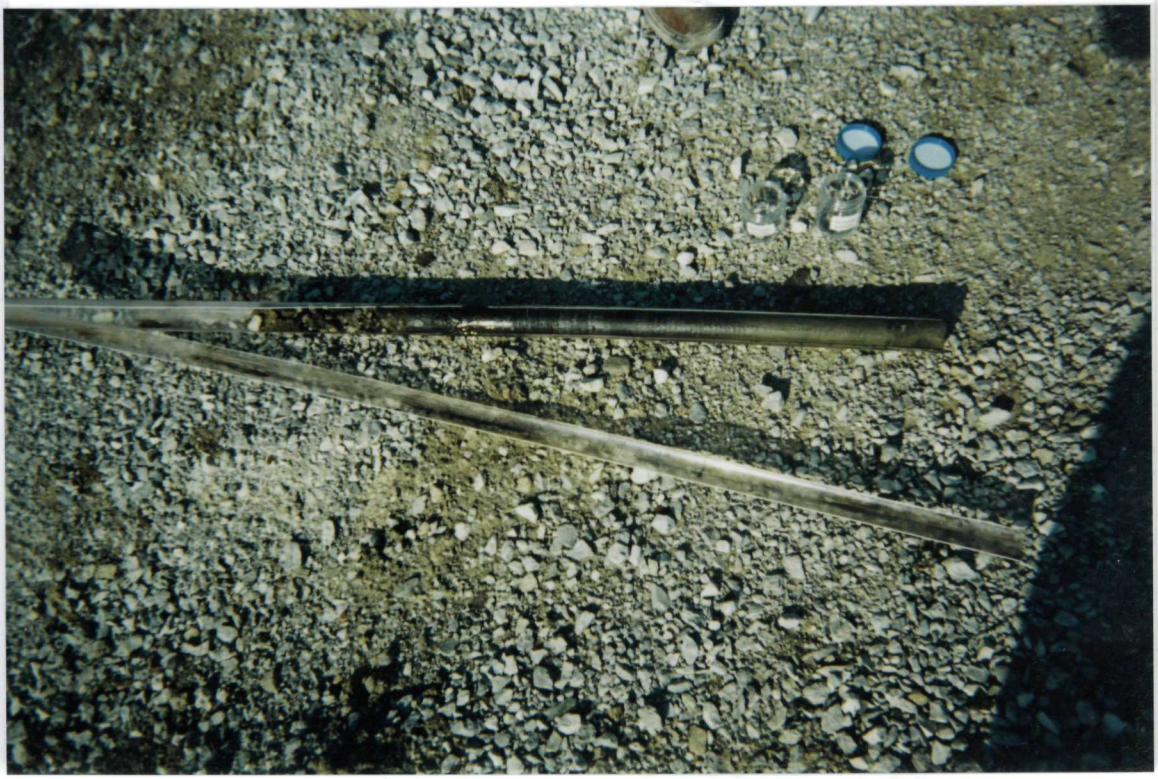
Site: Riverdale Chemical **Date:** 8/31/00 **Time:** 0902 **Direction:** N
TDD: S05-0008-002 **Photographer:** L. Lueck
Description: Northern one of two Geoprobe locations on west side of Hartwell Annex.

Site: Riverdale Chemical **Date:** 8/31/00 **Time:** 0936 **Direction:** ~E
TDD: S05-0008-002 **Photographer:** L. Lueck
Description: First wetland Geoprobe location; railroad spur in background.

Site: Riverdale Chemical **Date:** 8/31/00 **Time:** 1027 **Direction:** SSE
TDD: S05-0008-002 **Photographer:** L. Lueck
Description: Approximate location of second wetland Geoprobe location.

Site: Riverdale Chemical **Date:** 8/31/00 **Time:** 0841 **Direction:** SE
TDD: S05-0008-002 **Photographer:** L. Lueck
Description: Third Geoprobe location (SL17 is beyond driver's seat).

Site: Riverdale Chemical **Date:** 8/31/00 **Time:** 0848 **Direction:** ~S
TDD: S05-0008-002 **Photographer:** L. Lueck
Description: Fourth Geoprobe location (SL17 is under black bucket).



Site: Riverdale Chemical **Date:** 8/31/00 **Time:** 0850 **Direction:** --
TDD: S05-0008-002 **Photographer:** L. Lueck
Description: Core from fourth Geoprobe borehole; bottom (right) is typical Riverdale site shallow clay.

Site: Riverdale Chemical **Date:** 8/31/00 **Time:** 0858 **Direction:** N
TDD: S05-0008-002 **Photographer:** L. Lueck
Description: Forming for concrete in eastern railroad containment excavation.

Site: Riverdale Chemical **Date:** 8/28/00 **Time:** 0900 **Direction:** WSW
TDD: S05-0008-002 **Photographer:** L. Lueck
Description: Looking across site wetland at south half of site.

Site: Riverdale Chemical **Date:** 8/28/00 **Time:** 0925 **Direction:** N
TDD: S05-0008-002 **Photographer:** L. Lueck
Description: Current status of western railroad containment excavation.

Site: Riverdale Chemical **Date:** 8/31/00 **Time:** 0830 **Direction:** SW
TDD: S05-0008-002 **Photographer:** L. Lueck
Description: Second Geoprobe location, southwest of SL17.

Site: Riverdale Chemical **Date:** 8/31/00 **Time:** 0810 **Direction:** SE
TDD: S05-0008-002 **Photographer:** L. Lueck
Description: Setting up Geoprobe for first SL17 step-out boring.

Site: Riverdale Chemical **Date:** 8/24/00 **Time:** 1112 **Direction:** S
TDD: S05-0008-002 **Photographer:** L. Lueck
Description: Current raw materials storage area, southeast portion of site; off-site steel plant, right rear.

Site: Riverdale Chemical **Date:** 8/24/00 **Time:** 1134 **Direction:** NW
TDD: S05-0008-002 **Photographer:** L. Lueck
Description: Distribution of new test pits at the four corners of the previously sampled area around location SL01.

Site: Riverdale Chemical **Date:** 8/28//00 **Time:** 0808 **Direction:** S
TDD: S05-0008-002 **Photographer:** L. Lueck
Description: Completed excavation for eastern railroad spill containment.

Site: Riverdale Chemical **Date:** 8/28/00 **Time:** 0857 **Direction:** SSW
TDD: S05-0008-002 **Photographer:** L. Lueck
Description: Site wetland area; off-site steel plant, right rear.

Site: Riverdale Chemical **Date:** 8/24/00 **Time:** 1052 **Direction:** W
TDD: S05-0008-002 **Photographer:** L. Lueck
Description: Collecting new round of soil samples at points 5 feet from corners of previously sampled SL01 area.

Site: Riverdale Chemical **Date:** 8/24/00 **Time:** 1056 **Direction:** S
TDD: S05-0008-002 **Photographer:** L. Lueck
Description: Collecting 3½-foot-deep sample at location SL33, 5 feet northeast of previously sampled area around location SL01.

Site: Riverdale Chemical **Date:** 8/24/00 **Time:** 1101 **Direction:** E
TDD: S05-0008-002 **Photographer:** L. Lueck
Description: Railroad ties stored on property adjacent to site on the east.

Site: Riverdale Chemical **Date:** 8/24/00 **Time:** 1110 **Direction:** NW
TDD: S05-0008-002 **Photographer:** L. Lueck
Description: Track hoe excavating sampling pit at location SL34 south of burned warehouse slab.

Site: Riverdale Chemical **Date:** 8/23/00 **Time:** 1355 **Direction:** NNW
TDD: S05-0008-002 **Photographer:** L. Lueck
Description: Stockpile of cuttings from tank farm caisson drilling.

Site: Riverdale Chemical **Date:** 8/23/00 **Time:** 1405 **Direction:** N
TDD: S05-0008-002 **Photographer:** L. Lueck
Description: Track hoe removing soil for grab sample SL37 from bottom of eastern railroad containment excavation, near the southern end.

Site: Riverdale Chemical **Date:** 8/23/00 **Time:** 1406 **Direction:** SE
TDD: S05-0008-002 **Photographer:** L. Lueck
Description: Collecting soil sample SL37 from track hoe bucket.

Site: Riverdale Chemical **Date:** 8/24/00 **Time:** 1032 **Direction:** S
TDD: S05-0008-002 **Photographer:** L. Lueck
Description: Disturbed gravel between truck and concrete marks previously sampled SL01 area just south of slab that remains from 1992 warehouse fire.

Site: Riverdale Chemical **Date:** 8/22/00 **Time:** 1452 **Direction:** S
TDD: S05-0008-002 **Photographer:** L. Lueck
Description: Pouring concrete caissons in western half of tank farm.

Site: Riverdale Chemical **Date:** 8/23/00 **Time:** 1302 **Direction:** S
TDD: S05-0008-002 **Photographer:** L. Lueck
Description: Collecting composite sample of soil stockpiled from railroad spill containment excavation.

Site: Riverdale Chemical **Date:** 8/23/00 **Time:** 1305 **Direction:** NE
TDD: S05-0008-002 **Photographer:** L. Lueck
Description: Collecting composite sample of soil stockpiled from railroad spill containment excavation.

Site: Riverdale Chemical **Date:** 8/23/00 **Time:** 1346 **Direction:** SE
TDD: S05-0008-002 **Photographer:** L. Lueck
Description: Lowering bell bucket into caisson borehole to flare ("bell") the hole.

Site: Riverdale Chemical **Date:** 8/22/00 **Time:** 1405 **Direction:** SW, W
TDD: S05-0008-002 **Photographer:** L. Lueck
Description: Setting of Riverdale Chemical site on 17th Street in Chicago Heights, Illinois.

Site: Riverdale Chemical **Date:** 8/21/00 **Time:** 0929 **Direction:** NNE
TDD: S05-0008-002 **Photographer:** L. Lueck
Description: Northern part of wetland area, southeast corner of site.

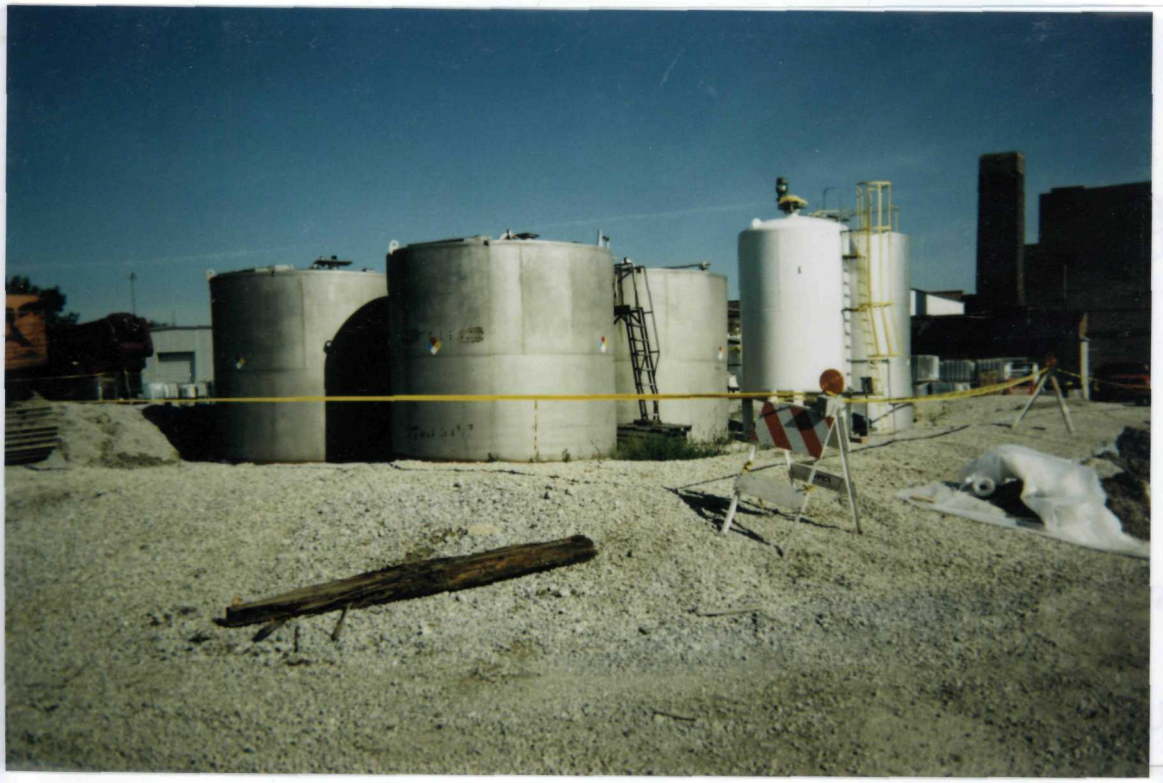
Site: Riverdale Chemical **Date:** 8/21/00 **Time:** 0930 **Direction:** SE
TDD: S05-0008-002 **Photographer:** L. Lueck
Description: Southeast part of site wetland area.

Site: Riverdale Chemical **Date:** 8/21/00 **Time:** 1008 **Direction:** SE
TDD: S05-0008-002 **Photographer:** L. Lueck
Description: Railroad containment area just prior to beginning of excavation.

Site: Riverdale Chemical **Date:** 8/22/00 **Time:** 1412 **Direction:** S
TDD: S05-0008-002 **Photographer:** L. Lueck
Description: Excavating eastern section of railroad spill containment area.

Site: Riverdale Chemical **Date:** 8/21/00 **Time:** 0917 **Direction:** SE
TDD: S05-0008-002 **Photographer:** L. Lueck
Description: Caisson drilling on western half of tank farm.

Site: Riverdale Chemical **Date:** 8/21/00 **Time:** 0918 **Direction:** NNE
TDD: S05-0008-002 **Photographer:** L. Lueck
Description: Caisson drilling on western half of tank farm.



Site: Riverdale Chemical **Date:** 8/21/00 **Time:** 0920 **Direction:** NW
TDD: S05-0008-002 **Photographer:** L. Lueck
Description: Existing eastern half of tank farm and crushed stone berm.

Site: Riverdale Chemical **Date:** 8/21/00 **Time:** 0923 **Direction:** NNE
TDD: S05-0008-002 **Photographer:** L. Lueck
Description: Remnant brick building and slab of raw materials warehouse that burned in 1992.

Attachment C

Data Tables

Table 1

START SOIL SAMPLES COLLECTED
RIVERDALE CHEMICAL
CHICAGO HEIGHTS, COOK COUNTY, ILLINOIS
August 8 - October 20, 2000

Sample Number	Date	Time	Location	Parameters
SL37	8/23/00	1415	South end of eastern railroad containment excavation; confirmation.	Pesticides
SL40	8/28/00	0925	South end of western railroad containment excavation; confirmation.	Pesticides
SL64	9/21/00	0800	Inside and just west of site gate; Geoprobe.	VOCs, SVOCs, pesticides, RCRA metals
SL76	10/20/00	0900	Southeastern corner, eastern half of tank farm; Geoprobe.	VOCs, SVOCs, pesticides, RCRA metals
SL80	11/2/00	1330	Tank farm excavation, east half, north end; confirmation.	VOCs, SVOCs, pesticides, RCRA metals

Key:
VOCs = Volatile Organic Compounds.
SVOCs = Semivolatile Organic Compounds.
RCRA = Resource Conservation and Recovery Act.

Source: START site logbook.

Table 2

ORGANIC ANALYTICAL RESULTS
RIVERDALE CHEMICAL
CHICAGO HEIGHTS, COOK COUNTY, ILLINOIS

Analyte	Sample Number				
	SL37	SL40	SL64	SL76	SL80
Pesticides (µg/kg)					
4,4'-DDD	ND	510	ND	ND	ND
4,4'-DDT	ND	500	ND	ND	ND
Aldrin	ND	6,000	ND	ND	110
alpha-Chlordane	ND	55	ND	ND	ND
Dieldrin	ND	82	ND	ND	ND
gamma-BHC (Lindane)	ND	42	ND	ND	ND
gamma-Chlordane	ND	360	ND	ND	ND
Heptachlor	ND	500	ND	ND	ND
VOCs (µg/kg)					
1,2,4-Trimethylbenzene	NA	NA	ND	2,400	110,000
1,3,5-Trimethylbenzene	NA	NA	ND	1,100	61,000
2-Methylnaphthalene	NA	NA	ND	7,900	32,000
4-Isopropyltoluene	NA	NA	ND	ND	2,500
Acetone	NA	NA	ND	ND	5,200
Ethylbenzene	NA	NA	ND	13,000	17,000
Isopropylbenzene	NA	NA	ND	ND	8,700
n-Butylbenzene	NA	NA	ND	ND	1,400
n-Propylbenzene	NA	NA	ND	460	24,000
Naphthalene	NA	NA	ND	5,800	22,000
o-Xylene	NA	NA	ND	ND	17,000
p&m-Xylene	NA	NA	ND	29,000	57,000
sec-Butylbenzene	NA	NA	ND	ND	1,200
Toluene	NA	NA	160	ND	ND

Table 2, continued

ORGANIC ANALYTICAL RESULTS
RIVERDALE CHEMICAL
CHICAGO HEIGHTS, COOK COUNTY, ILLINOIS

Analyte	Sample Number				
	SL37	SL40	SL64	SL76	SL80
SVOCs (µg/kg)					
2-Methylnaphthalene	NA	NA	ND	6,840	7,950
Naphthalene	NA	NA	ND	1,490	ND

Key:
µg/kg = Micrograms per kilogram.
VOCs = Volatile organic compounds.
SVOCs = Semivolatile organic compounds.
NA = Not analyzed.
ND = Not detected.

Source: CT&E Environmental Services, Inc., Ludington, Michigan; Analytical TDD S05-0008-810.

Table 3

RCRA METALS ANALYTICAL RESULTS
RIVERDALE CHEMICAL
CHICAGO HEIGHTS, COOK COUNTY, ILLINOIS

Analyte	Sample Number				
	SL37	SL40	SL64	SL76	SL80
RCRA metals (mg/kg)					
Arsenic	NA	NA	8.3	6.5	8.5
Barium	NA	NA	52	65	98
Cadmium	NA	NA	1.1	0.13	0.18
Chromium	NA	NA	19	18	23
Lead	NA	NA	37	11	16
Mercury	NA	NA	0.030	ND	0.026
Selenium	NA	NA	0.60	0.35	0.20
Silver	NA	NA	ND	ND	ND

Key:
mg/kg = Milligrams per kilogram.
RCRA = Resource Conservation and Recovery Act.
NA = Not analyzed.
ND = Not detected.

Source: CT&E Environmental Services, Inc., Ludington, Michigan; Analytical TDD S05-0008-810.

Attachment D

Validated Analytical Results

This information will be reported to U.S. EPA separately